

EMISSIONS TEST REPORT

Report Number: 3104706DAL-008

Project Number: 3104706

Testing performed on the

Spot Radio Frequency Location System - BEACON

Model: 40001A001

FCC ID: RO540001A001

To

FCC Part 15 Subpart C 15.247

Industry Canada's RSS-210 Issue 6 September 2005, Annex 8

FCC Part 15 Subpart B and ICES-003 Issue 4 February 2004

For

InnerWireless, Inc.

Test Performed by:
Intertek – ETL SEMKO
420 N Dorothy Drive,
Richardson, TX 75081 USA

Test Authorized by:
Wavetrix
801 Presidential Drive,
Richardson, TX 75081 USA

Prepared by: Skumble
Sudesh Kamble

Date: November 3, 2006

Reviewed by: Roland W. Gubisch
Roland W. Gubisch

Date: November 20, 2006

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Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: InnerWireless, Inc.
1155 Kas Drive,
Richardson, TX 75081 USA
Contact: Mr. James McCoy
Telephone: (972) 201-2522
Fax: (972) 479-9625

1.2 Equipment Under Test

Equipment Type: BEACON
Model Number(s): 40001A001
Serial number(s): 100000000000036D
Manufacturer: Creation Technologies, Inc.
1001 Klein Rd, Suite 100
Plano, TX 75074 USA
Mr. Edward Goodwin
Phone : (972) 680-8394, x102

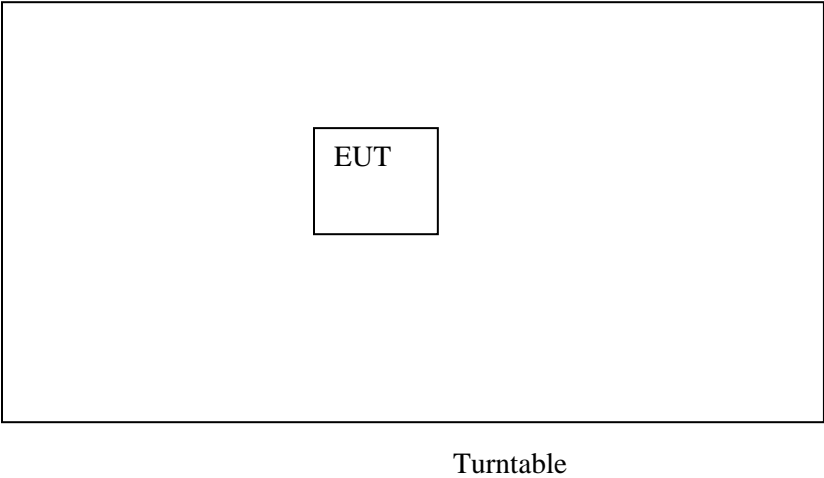
EUT receive date: 10/01/06
EUT received condition: Prototypes in Good Condition
Test start date: 10/01/06
Test end date: 10/21/06

1.3 Test Plan Reference

Tested according to the standards listed, ANSI C63.4:2003, and RSS-Gen Issue 1 September 2005.

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2 Cables:

| Cable | Shielding | Connector | Length (m) | Qty. |
|-------|-----------|-----------|------------|------|
| None | | | | |

1.4.3. Support Equipment & Equipment Under Test:

Support Equipment:
Name: None
Model No.:
Serial No.:

1.5 Mode(s) of Operation:

The BEACON was activated from two fresh 6.0V lithium batteries. Only one battery is required for system operation. The EUT was continuously transmitting a modulated carrier at low, mid, and high channels and was manipulated in three orthogonal axes. The EUT does not have an antenna port.

1.6 Floor Standing Equipment:

Applicable: ☐ ☐ Not Applicable: ☒ ☐

1.7 Modifications Required for Compliance:

No modifications required.

2 Test Summary

| TEST STANDARD | RESULTS | |
|--|---|---|
| FCC Part 15 Subpart C 15.247, Industry Canada's RSS-210 Issue 6 September 2005 Annex 8, FCC Part 15 Subpart B, and Industry Canada's ICES-003 Issue 4 February 2004 | | |
| SUB-TEST | TEST PARAMETER | COMMENT |
| Maximum Peak Conducted Output Power and Human RF Exposure FCC 15.247(b)(3-5), RSS-210 A8.4, RSS-102 4.3 | The output power of the Radio Module must not exceed 1 Watt (30 dBm) and 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm ² . | Pass |
| Occupied Bandwidth FCC 15.247(a)(2), RSS-210 A8.2 | The 6 dB bandwidth of the Radio Module must be at least 500 kHz. | Pass |
| Antenna Port Conducted Spurious Emissions FCC 15.209, 15.247(d), RSS-210 A8.5 | The spurious emissions of the Radio Module must be attenuated below the level of the fundamental by at least 20 dBc. | Not Applicable Integral Antenna |
| Radiated Spurious Emissions FCC 15.205, 15.209, 15.247(d), 15.109, RSS-210 2.2, 2.7, A8.5, ICES-003 | The spurious emissions of the Radio Module must be attenuated below the level of the fundamental by at least 20 dBc. Emissions which fall in the restricted bands must meet the general limits of 15.209 and RSS-210 2.7 Table 2. The spurious emissions of the BEP must not exceed the limits of 15.109 Class A and ICES-003 Class A. | Pass |
| Peak Power Spectral Density FCC 15.247(e), RSS-210 A8.2 | The peak power spectral density of the Radio Module must not exceed 8 dBm / 3 kHz. | Pass |
| Band Edge Compliance FCC 15.215, RSS-210 2.1, A8.5 | The fundamental frequency of the Radio Module must stay within the assigned frequency band. | Pass |
| AC Line-Conducted Emissions FCC 15.207, 15.107, RSS-Gen 7.2.2, ICES- 003 | The AC line-conducted emissions of the Radio Module must not exceed the limits of 15.207 and RSS-Gen 7.2.2 Table 2. The AC line-conducted emissions of the BEP must not exceed the limits of 15.107 Class A and ICES-003 Class A. | Not Applicable Battery powered Device |

Notes: The BEACON was tested as a Class A digital device to FCC Part 15 Subpart B and ICES-003, Intentional transmission was tested as a transmitter to the requirements of FCC Part 15 Subpart C 15.247 and RSS-210 Annex 8. Channels selected for test were:

Channel 11: 2405 MHz, Channel 17: 2435 MHz, Channel 26: 2480 MHz

3 REVISION SUMMARY

The following changes have been made to this Report:

| <u>Date</u> | <u>Project</u> <u>No.</u> | <u>Project</u> <u>Handler</u> | <u>Page(s)</u> | <u>Item</u> | <u>Description of Change</u> |
|-------------|------------------------------|----------------------------------|----------------|-------------|------------------------------|
|-------------|------------------------------|----------------------------------|----------------|-------------|------------------------------|

4 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ V/m

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB μ V

- RF = Reading from receiver in dB μ V
- LF = LISN Correction Factor in dB
- CF = Cable Correction Factor in dB
- AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF/20)} \text{ where UF = Net Reading in } \mu\text{V}$$

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m}$$

4.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be:
 ± 3.6 dB at 3m

The expanded uncertainty ($k = 2$) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 1.74 dB

5 Site Description

Test Site(s): 1

The test facility is located at 420 N Dorothy Drive, Richardson, TX - 75081

The FCC site registration number for this site is 10157.

The Industry Canada file no. is IC 6018.

Measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16/ ANSI 63.4 and the measuring antenna correlates to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 10 meters from the EUT. If the field-strength measurements at 10m cannot be made because of high ambient noise level or for other reasons, measurements of Class B equipment may be made at a closer distance, for example 3m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane.

The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for radiated disturbance tests followed the guidelines of CISPR 16 and ANSI 63.4.

6 Test Results

6.1 Test: Transmitter Output Power and EIRP, and Human RF Exposure

Test Standard: FCC 15.247(b)(3-5), RSS-210 A8.4, RSS-102 4.3

Test Results: Pass

Test Environment:

| | | | | | | |
|--|---------------|-----|-----------------------|--------|---------------|-----|
| Environmental Conditions During Testing: | Humidity (%): | N/A | Pressure (hPa): | N/A | Ambient (°C): | N/A |
| Pretest Verification Performed | N/A | | Equipment under Test: | BEACON | | |

Maximum Test Parameters: The output power of the Radio Module must not exceed 1 Watt (30 dBm) and 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm².

Test Equipment Used:

| Equip. ID | Description | Manufacturer | Model | Serial Number | Cal Date | Cal Due |
|-----------|----------------------|--------------|----------|-----------------|----------|----------|
| 77 | EMI Receiver | R & S | ES17 | 100044 | 10/14/05 | 10/14/06 |
| 192 | Handheld Manometer | Omega | HHP-102F | 19.99/29.0 PSIA | 02/23/06 | 02/23/07 |
| 260 | Humidity Temperature | Extech | 445580 | 17-260 | 10/26/05 | 10/26/06 |
| 30 | DMM | Fluke | 8060A | 6191012 | 02/02/06 | 02/02/07 |
| 82 | Bi-ConiLog Antenna | Schaffner | CBL6112B | 2726 | 06/13/06 | 06/13/07 |
| 128 | RF Cable | Custom made | #1 | none | 08/01/06 | 08/01/07 |
| 131 | RF Cable | Custom made | #4 | none | 08/01/06 | 08/01/07 |
| 271 | Horn Antenna | A H Systems | SAS-571 | 787 | 02/08/06 | 02/08/07 |
| 101 | EMI Receiver | Agilent | E7405A | US40240235 | 11/23/05 | 11/23/06 |

Test Results:

Notes: The cable loss and antenna factor were compensated for in the spectrum analyzer. The field strength obtained at 3 meters distance was converted to EIRP using the equations of DA-00-705A1. A 100 kHz bandwidth and RMS detector were used with a 50 MHz span in order to have 500 discrete non-overlapping values for integration. Since the antenna is integral, conducted output power compliance cannot be demonstrated.

As referenced in RSS-102 2.5, the EUT is exempt from SAR evaluation because the output power is less than 20 mW and RF evaluation because the operating frequency is above 1.5 GHz and the EIRP does not exceed 5 watts. The FCC human RF exposure limit is 1 mW/cm². The power density S generated by some value of EIRP at a given distance d is related by the equation:

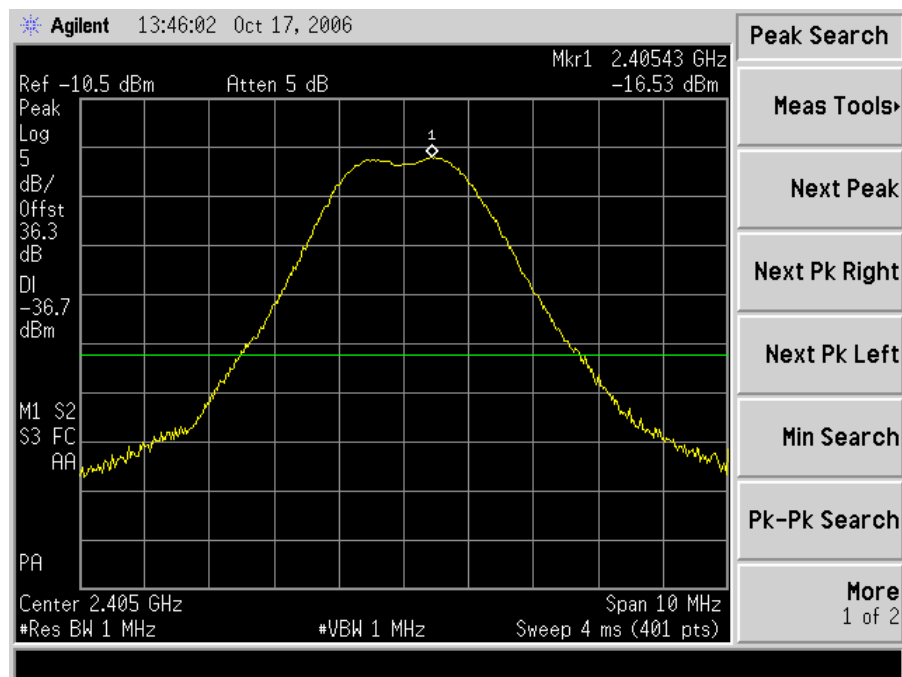
$$S = \text{EIRP} / (4\pi d^2)$$

The distance, given a maximum EIRP of -9.28 dBm (0.12 mW) at which the radiated power density of the EUT is equal to the human RF exposure limit is 0.097 cm from the antenna. Note that the EUT is exempt from FCC SAR evaluation because the output power is less than 25 mW.

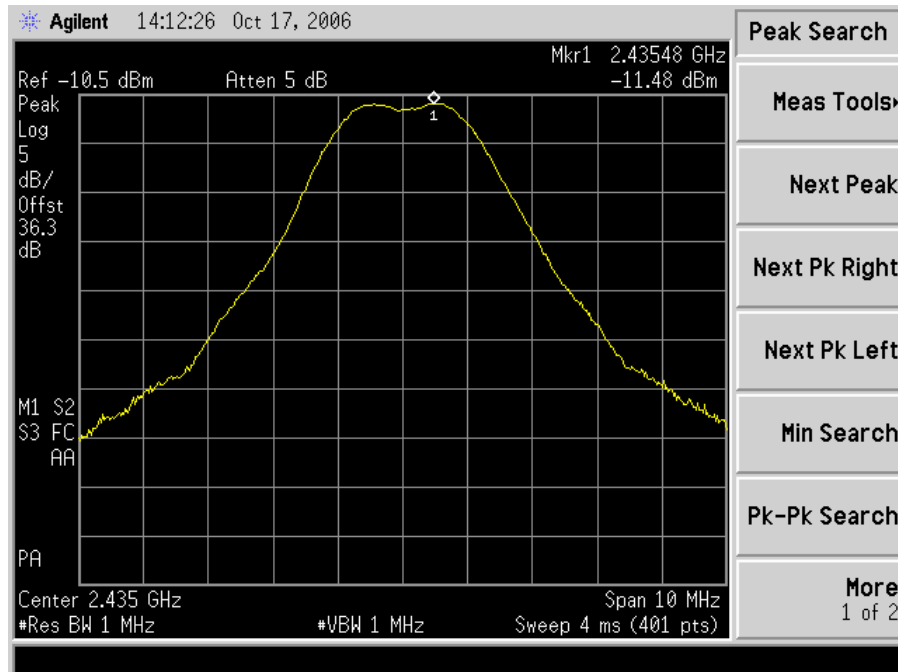
| Antenna | Type | Model | Connector | Gain |
|------------------|------|-------|-----------|------|
| Integral Antenna | N/A | N/A | N/A | N/A |

| Channel | Frequency | Power** | Limit | EIRP | EIRP Limit |
|---------|-----------|------------|----------|------------|------------|
| 11 | 2405 MHz | -16.53 dBm | 30.0 dBm | -14.33 dBm | 36.0 dBm |
| 17 | 2435 MHz | -11.48 dBm | 30.0 dBm | -9.28 dBm | 36.0 dBm |
| 26 | 2480 MHz | -16.73 dBm | 30.0 dBm | -14.53 dBm | 36.0 dBm |

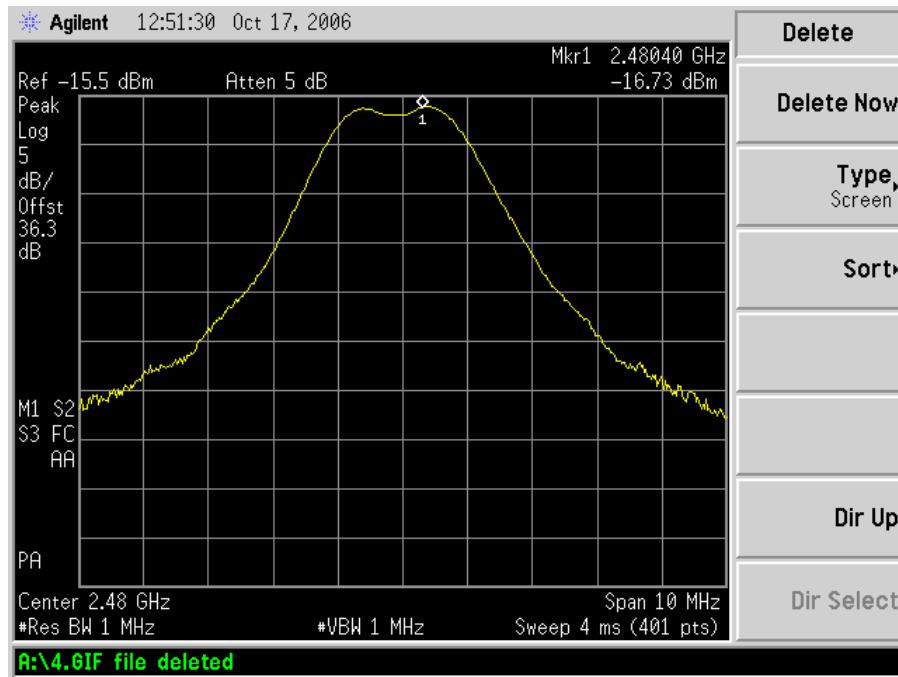
** Measured at 3m distance



Channel 11



Channel 17



Channel 26

6.2 Test: Occupied Bandwidth

Test Standard: FCC 15.247(a)(2), RSS-210 A8.2

Test Results: Pass

Test Environment:

| | | | | | | |
|--|---------------|-----|-----------------------|-----|---------------|-----|
| Environmental Conditions During Testing: | Humidity (%): | N/A | Pressure (hPa): | N/A | Ambient (°C): | N/A |
| Pretest Verification Performed | N/A | | Equipment under Test: | | BEACON | |

Maximum Test Parameters: The 6 dB bandwidth of the Radio Module must be at least 500 kHz.

Test Equipment Used:

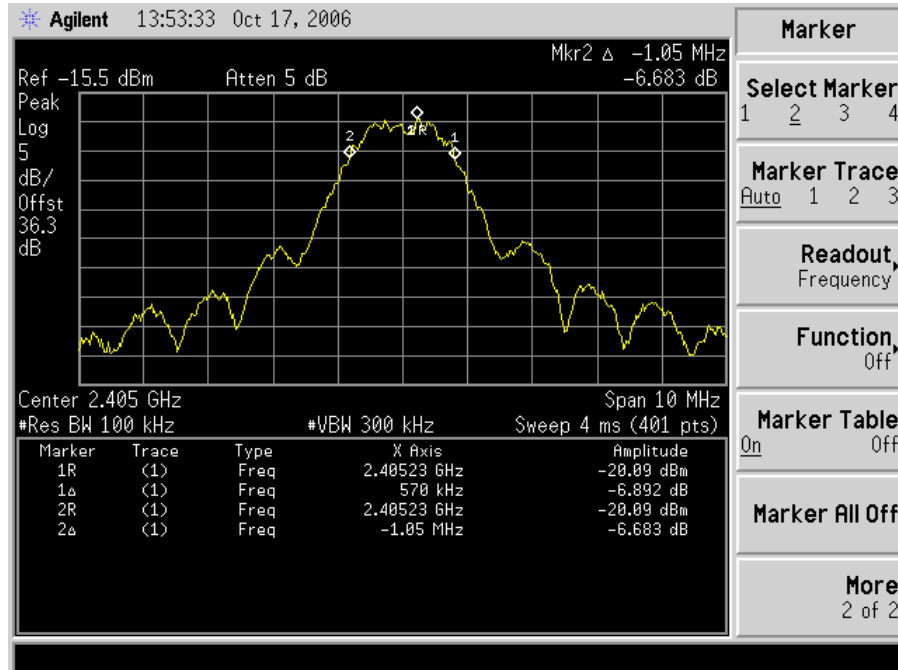
| Equip. ID | Description | Manufacturer | Model | Serial Number | Cal Date | Cal Due |
|-----------|----------------------|--------------|----------|-----------------|----------|----------|
| 77 | EMI Receiver | R & S | ES17 | 100044 | 10/14/05 | 10/14/06 |
| 192 | Handheld Manometer | Omega | HHP-102F | 19.99/29.0 PSIA | 02/23/06 | 02/23/07 |
| 260 | Humidity Temperature | Extech | 445580 | 17-260 | 10/26/05 | 10/26/06 |
| 30 | DMM | Fluke | 8060A | 6191012 | 02/02/06 | 02/02/07 |
| 82 | Bi-ConiLog Antenna | Schaffner | CBL6112B | 2726 | 06/13/06 | 06/13/07 |
| 128 | RF Cable | Custom made | #1 | none | 08/01/06 | 08/01/07 |
| 131 | RF Cable | Custom made | #4 | none | 08/01/06 | 08/01/07 |
| 271 | Horn Antenna | A H Systems | SAS-571 | 787 | 02/08/06 | 02/08/07 |
| 101 | EMI Receiver | Agilent | E7405A | US40240235 | 11/23/05 | 11/23/06 |

Test Results:

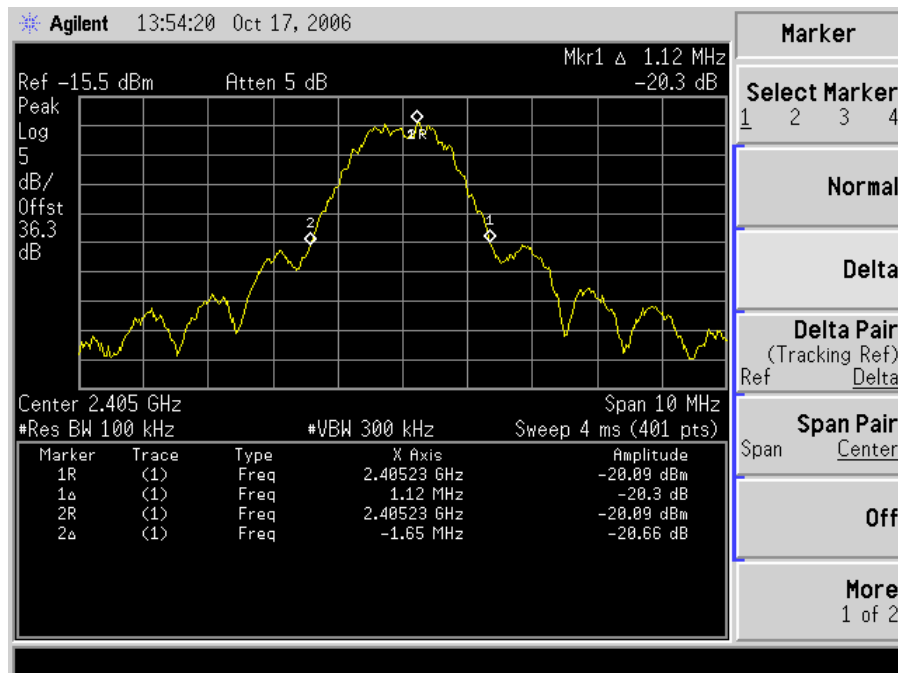
Notes: There is no limit on the 20 dB bandwidth; it is simply included for informational purposes. The 20 dB bandwidth is referenced to the actual RF output power.

| Channel | Frequency | 6 dB Bandwidth |
|---------|-----------|----------------|
| 11 | 2405 MHz | 1.62 MHz |
| 17 | 2435 MHz | 1.59 MHz |
| 26 | 2480 MHz | 1.55 MHz |

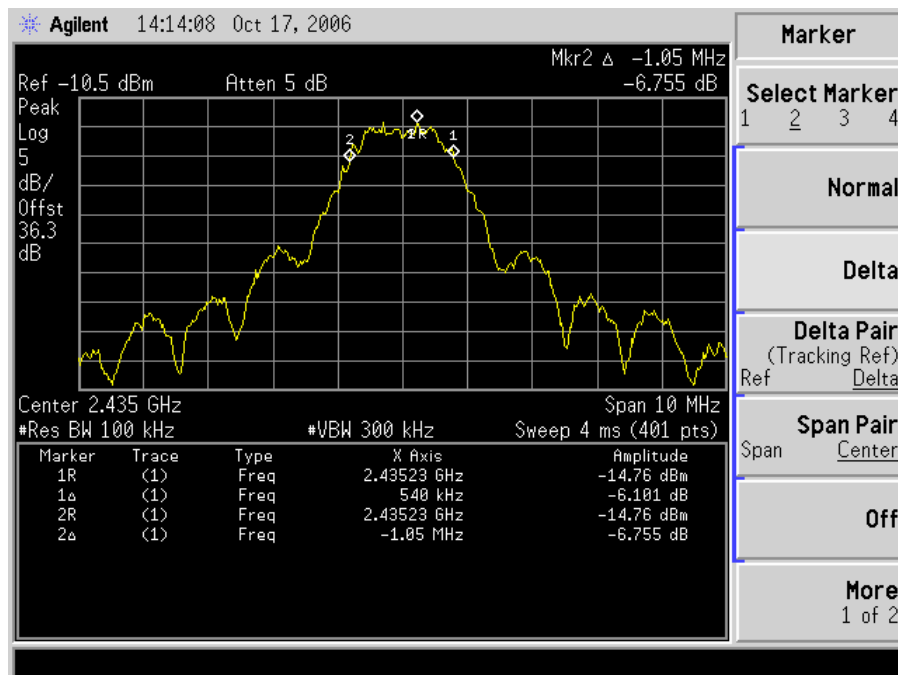
| Channel | Frequency | 20 dB Bandwidth |
|---------|-----------|-----------------|
| 11 | 2405 MHz | 2.77 MHz |
| 17 | 2435 MHz | 2.78 MHz |
| 26 | 2480 MHz | 2.71 MHz |



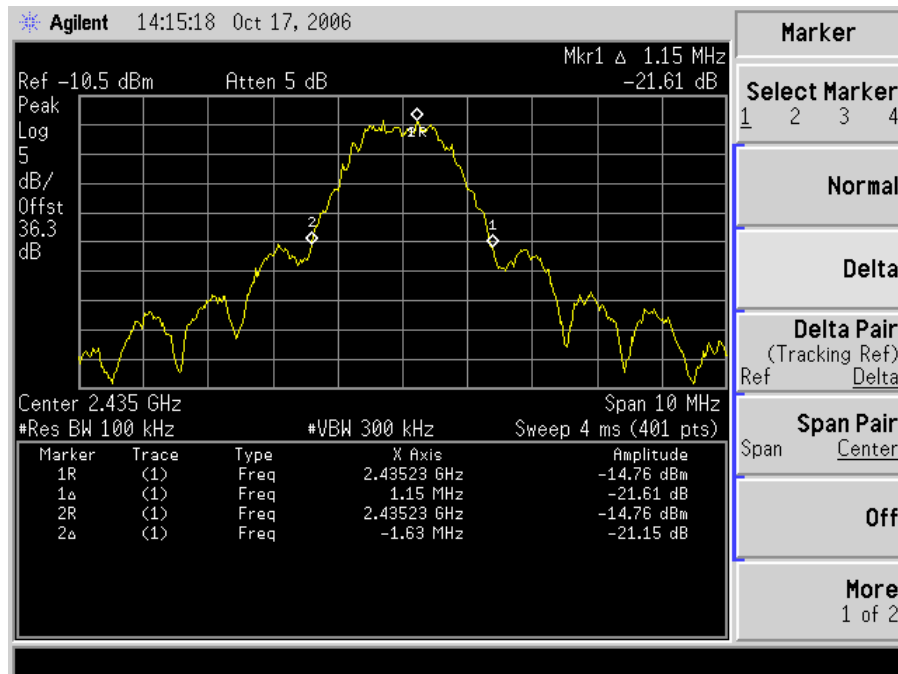
Channel 11 6dB Bandwidth



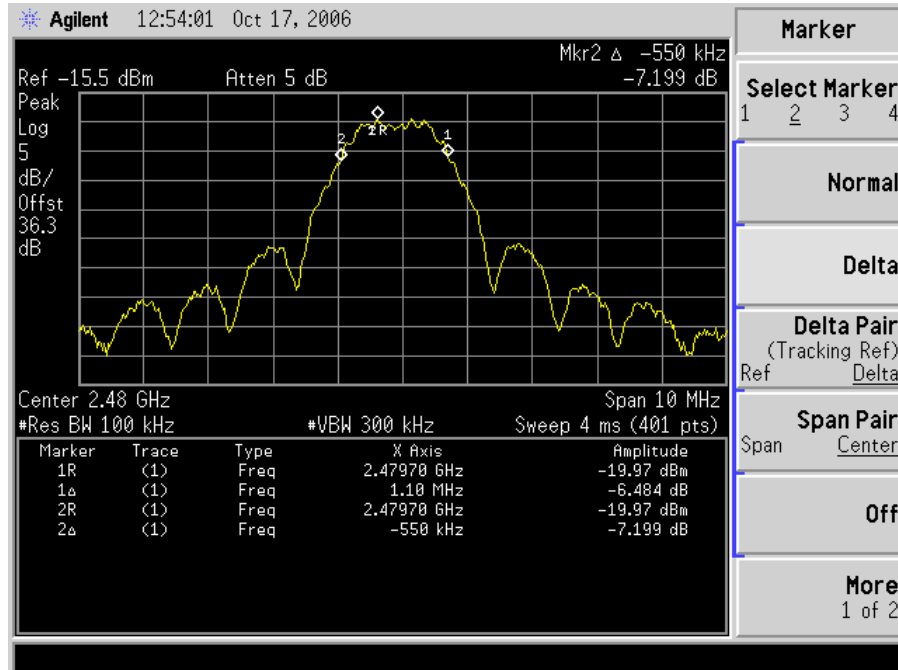
Channel 11 20 dB Bandwidth



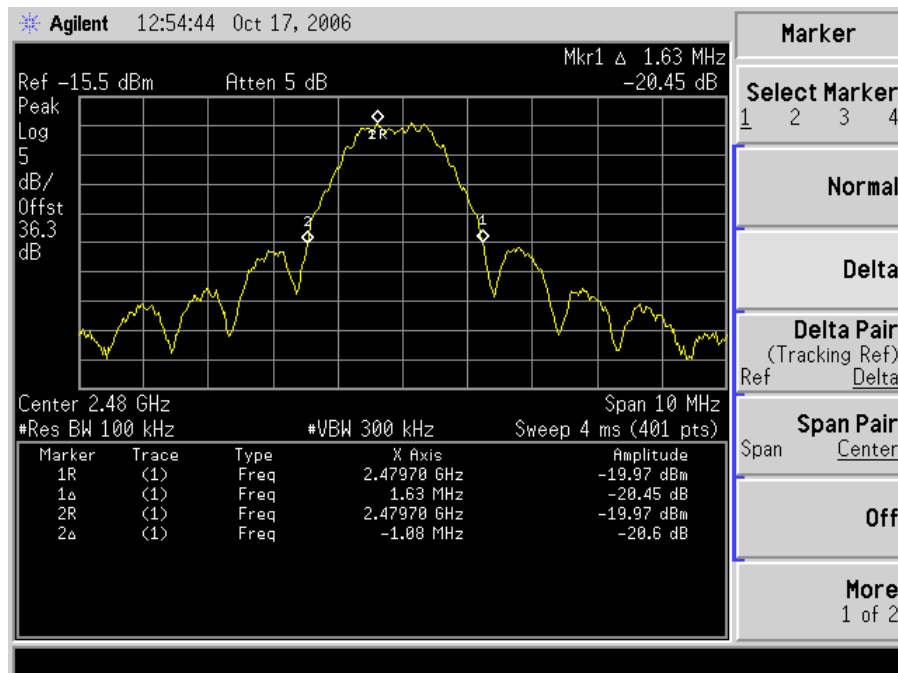
Channel 17 6 dB Bandwidth



Channel 17 20 dB Bandwidth



Channel 26 6 dB Bandwidth



Channel 26 20 dB Bandwidth

6.3 Test: Radiated Spurious Emissions

Test Standard: FCC 15.205, 15.209, 15.247(d), 15.109, RSS-210 2.2, 2.7, A8.5, ICES-003

Test Results: Pass

Test Environment:

| | | | | | | |
|--|---------------|------------|-----------------------|------------|---------------|------------|
| Environmental Conditions During Testing: | Humidity (%): | See Tables | Pressure (hPa): | See Tables | Ambient (°C): | See Tables |
| Pretest Verification Performed | N/A | | Equipment under Test: | | BEACON | |

Maximum Test Parameters: The spurious emissions of the Radio Module must be attenuated below the level of the fundamental by at least 20 dBc. Emissions which fall in the restricted bands must meet the general limits of 15.209 and RSS-210 2.7 Table 2. The spurious emissions of the EUT must not exceed the limits of 15.109 Class A and ICES-003 Class A.

Test Equipment Used:

| Equip. ID | Description | Manufacturer | Model | Serial Number | Cal Date | Cal Due |
|-----------|--------------------------|--------------|----------------------|-----------------|----------|----------|
| 77 | EMI Receiver | R & S | ES17 | 100044 | 10/14/05 | 10/14/06 |
| 192 | Handheld Manometer | Omega | HHP-102F | 19.99/29.0 PSIA | 02/23/06 | 02/23/07 |
| 260 | Humidity Temperature | Extech | 445580 | 17-260 | 10/26/05 | 10/26/06 |
| 30 | DMM | Fluke | 8060A | 6191012 | 02/02/06 | 02/02/07 |
| 82 | Bi-ConiLog Antenna | Schaffner | CBL6112B | 2726 | 06/13/06 | 06/13/07 |
| 128 | RF Cable | Custom made | #1 | none | 08/01/06 | 08/01/07 |
| 131 | RF Cable | Custom made | #4 | none | 08/01/06 | 08/01/07 |
| 271 | Horn Antenna | A H Systems | SAS-571 | 787 | 02/08/06 | 02/08/07 |
| 101 | EMI Receiver | Agilent | E7405A | US40240235 | 11/23/05 | 11/23/06 |
| 222 | Pre-Amp | Miteq | AMF-4D-001180-24-10P | 1020106 | 08/01/06 | 08/01/07 |
| 213153 | High Pass Filter, 4 GHz | Reactel | 7HS-4G/18G-S11 | 01-7 | 03/06/06 | 03/06/07 |
| 213154 | High Pass Filter, 3 GHz | Filtek | HP12/3000-5AB | 15B57-01 | 03/06/06 | 03/06/07 |
| 213023 | Antenna, Horn, 18-40 GHz | EMCO | 3166 | 9310-2222 | 3/22/06 | 3/26/07 |

Notes: Above 1 GHz, the emissions shown compare the peak values with the average limits in order to demonstrate overall compliance. The range up to 26 GHz was investigated using the SHF equipment listed in the tables, but only the emissions shown were observed. In cases where no emissions were observed, the noise floor was verified to be under the limit.

Notes: The BEACON was tested as a Class A digital device to FCC Part 15 Subpart B and ICES-003; Intentional transmission was tested as a transmitter to the requirements of FCC Part 15 Subpart C 15.247 and RSS-210 Annex 8. Channels selected for test were:

Channel 11: 2405 MHz,

Channel 17: 2435 MHz,

Channel 26: 2480 MHz

Standard: FCC 15.109

Test: Radiated Emissions

Frequency Range: 30 MHz to 1000 MHz

Limits: Class A

EUT Configuration: BEACON (Measured as complete System with Master Radio(AC Adapter) and Beacon)

Measurement Uncertainty: 3.6 dB

Temperature: 24.5 °C

Relative Humidity: 31.9 %Rh

Atmospheric Pressure: 1000 mbar

Radiated Disturbance

| Polarity | Frequency MHz | Ant Height cm | Azimuth deg. | QP dBuV/m | LIMIT dBuV/m | Margin dB |
|----------|------------------|---------------------|-----------------|--------------|-----------------|--------------|
| H | 923.44 | 180.00 | 278.00 | 35.57 | 57 | -21.43 |
| H | 874.98 | 191.00 | 286.00 | 50.23 | 57 | -6.77 |
| H | 812.48 | 117.00 | 312.00 | 54.48 | 57 | -2.52 |
| H | 749.99 | 117.00 | 181.00 | 54.32 | 57 | -2.68 |
| H | 687.46 | 126.00 | 12.00 | 49.73 | 57 | -7.27 |
| H | 549.99 | 148.00 | 81.00 | 35.76 | 57 | -21.24 |
| H | 400.01 | 119.00 | 97.00 | 41.01 | 57 | -15.99 |
| H | 300.00 | 116.00 | 144.00 | 51.23 | 57 | -5.77 |
| H | 199.99 | 156.00 | 135.00 | 39.01 | 54 | -14.99 |
| H | 31.02 | 345.00 | 285.00 | 29.14 | 50 | -20.86 |
| V | 32.42 | 351.00 | 104.00 | 28.21 | 50 | -21.79 |
| V | 34.48 | 117.00 | 11.00 | 32.16 | 50 | -17.84 |
| V | 37.19 | 351.00 | 41.00 | 23.97 | 50 | -26.03 |
| V | 300.01 | 116.00 | 344.00 | 47.25 | 57 | -9.75 |
| V | 687.48 | 116.00 | 295.00 | 46.10 | 57 | -10.9 |
| V | 749.99 | 126.00 | 198.00 | 51.01 | 57 | -5.99 |
| V | 812.47 | 185.00 | 202.00 | 51.83 | 57 | -5.17 |
| V | 874.99 | 115.00 | 178.00 | 45.86 | 57 | -11.14 |
| V | 935.64 | 139.00 | 302.00 | 36.44 | 57 | -20.56 |

Standard: FCC 15.109
 Test: Radiated Emissions
 Frequency Range: 30 MHz to 1000 MHz
 Limits: Class A
 Measurement Distance: 3 meters
 EUT Configuration: BEACON (Measured as complete System with Master Radio(PoE) and Beacon)

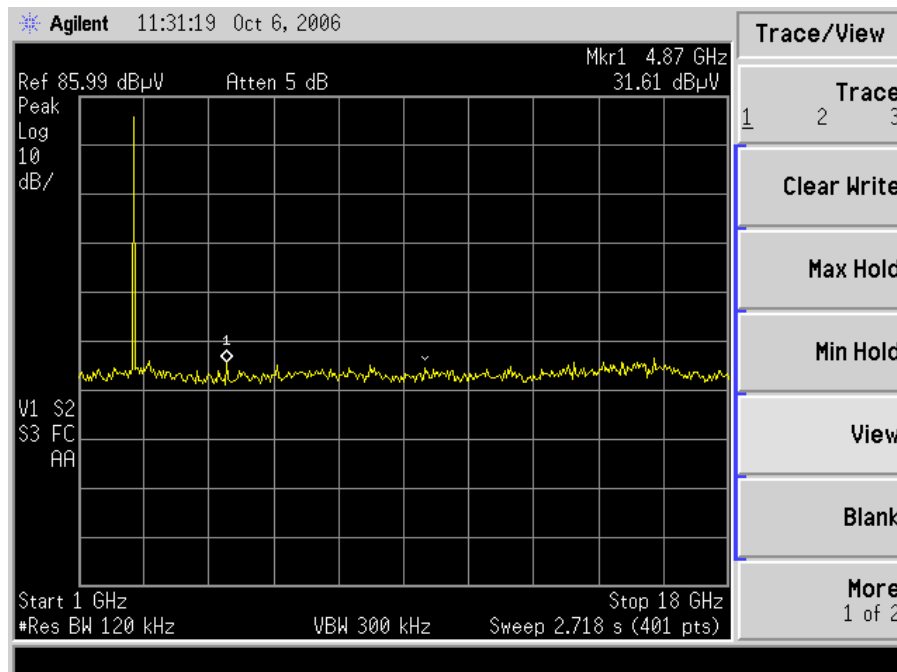
Measurement Uncertainty: 3.6 dB
 Temperature: 24.5 °C
 Relative Humidity: 31.9 %Rh
 Atmospheric Pressure: 1000 mbar

Radiated Disturbance

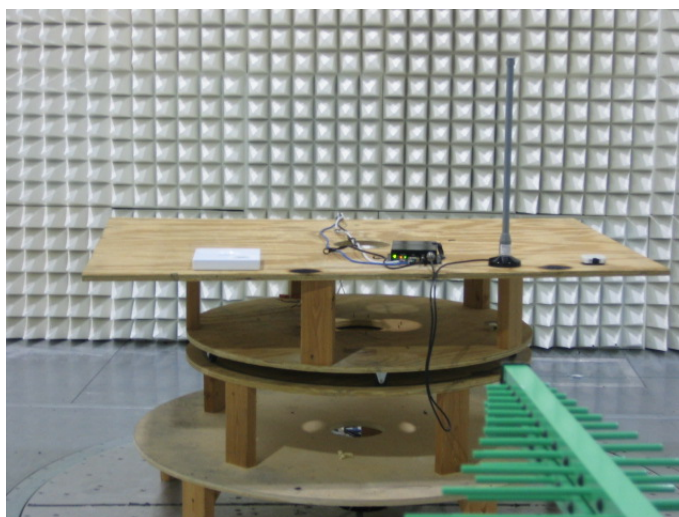
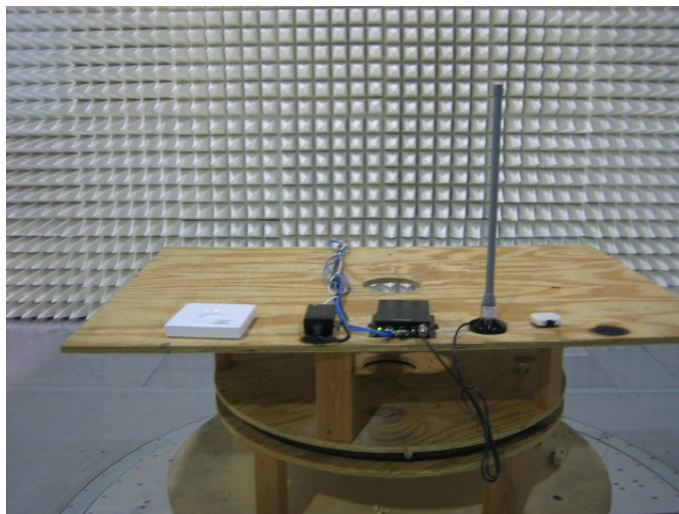
| Polarity | Frequency | Ant | Azimuth | QP | LIMIT | Margin |
|----------|-----------|-----|---------|-------|-------|--------|
| H | 874.98 | 115 | 303 | 43.70 | 57 | -13.3 |
| H | 812.48 | 116 | 167 | 53.22 | 57 | -3.78 |
| H | 749.97 | 117 | 148 | 52.23 | 57 | -4.77 |
| H | 300.00 | 117 | 238 | 46.16 | 57 | -10.84 |
| H | 250.01 | 116 | 125 | 39.19 | 57 | -17.81 |
| H | 199.96 | 132 | 221 | 32.53 | 54 | -21.47 |
| H | 105.30 | 291 | 285 | 39.35 | 54 | -14.65 |
| H | 104.17 | 271 | 261 | 36.08 | 54 | -17.92 |
| H | 102.58 | 254 | 264 | 37.05 | 54 | -16.95 |
| H | 101.90 | 303 | 276 | 40.22 | 54 | -13.78 |
| H | 99.31 | 306 | 270 | 39.46 | 54 | -14.54 |
| H | 98.41 | 299 | 285 | 40.32 | 54 | -13.68 |
| H | 96.65 | 260 | 273 | 33.72 | 54 | -20.28 |
| V | 38.95 | 329 | 18 | 35.88 | 50 | -14.12 |
| V | 45.63 | 117 | 42 | 34.11 | 50 | -15.89 |
| V | 58.73 | 126 | 11 | 33.87 | 50 | -16.13 |
| V | 59.43 | 116 | 12 | 35.39 | 50 | -14.61 |
| V | 60.25 | 216 | 202 | 32.97 | 50 | -17.03 |
| V | 60.89 | 117 | 19 | 34.73 | 50 | -15.27 |
| V | 62.08 | 124 | 10 | 32.76 | 50 | -17.24 |
| V | 62.99 | 211 | 351 | 36.41 | 50 | -13.59 |
| V | 200.01 | 117 | 90 | 30.34 | 54 | -23.66 |
| V | 250.01 | 116 | 120 | 33.91 | 57 | -23.09 |
| V | 300.00 | 115 | 300 | 41.36 | 57 | -15.64 |
| V | 749.99 | 116 | 258 | 46.57 | 57 | -10.43 |
| V | 812.49 | 116 | 178 | 50.08 | 57 | -6.92 |
| V | 874.98 | 116 | 326 | 42.67 | 57 | -14.33 |

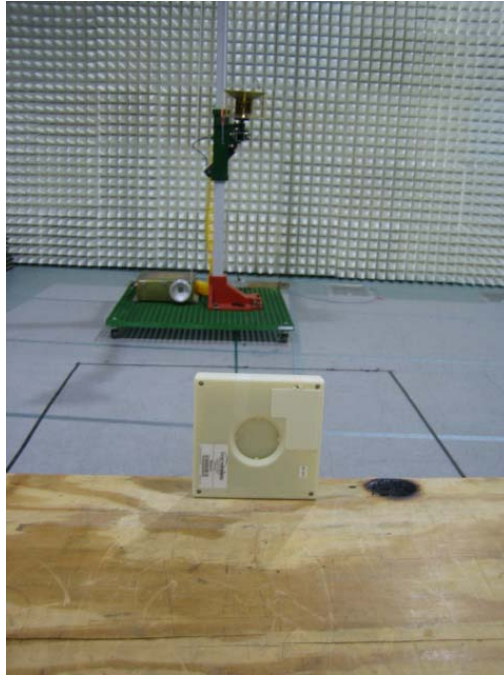
| Polarity | Frequency GHz | Ant Height cm | Azimuth deg. | Peak dBuV/m | LIMIT dBuV/m | Margin dB |
|----------|------------------|---------------------|-----------------|----------------|-----------------|--------------|
| V | 2.4055 | 100 | 0 | 90.47 | --- | --- |
| V | 2.4354 | 100 | 0 | 95.52 | --- | --- |
| V | 2.4805 | 100 | 0 | 90.27 | --- | --- |

| Polarity | Frequency GHz | Ant Height cm | Azimuth deg. | AVG dBuV/m | LIMIT dBuV/m | Margin dB |
|----------|------------------|---------------------|-----------------|---------------|-----------------|--------------|
| V | 4.8109 | 100 | 0 | 43.65 | 54.00 | -10.35 |
| V | 4.8697 | 100 | 0 | 46.13 | 54.00 | -7.87 |
| V | 4.9711 | 100 | 0 | 45.12 | 54.00 | -8.88 |
| V | 7.2143 | 100 | 0 | 45.46 | 54.00 | -8.54 |
| V | 7.3068 | 100 | 0 | 42.96 | 54.00 | -11.04 |
| V | 7.4393 | 100 | 0 | 43.65 | 54.00 | -10.35 |



6.4 Setup Photos





Test Results: Pass

6.5 Test: Peak Power Spectral Density

Test Standard: FCC 15.247(e), RSS-210 A8.2

Test Environment:

| | | | | | | |
|--|---------------|-----|-----------------------|--------|---------------|-----|
| Environmental Conditions During Testing: | Humidity (%): | N/A | Pressure (hPa): | N/A | Ambient (°C): | N/A |
| Pretest Verification Performed | N/A | | Equipment under Test: | BEACON | | |

Maximum Test Parameters: The peak power spectral density of the Radio Module must not exceed 8 dBm / 3 kHz.

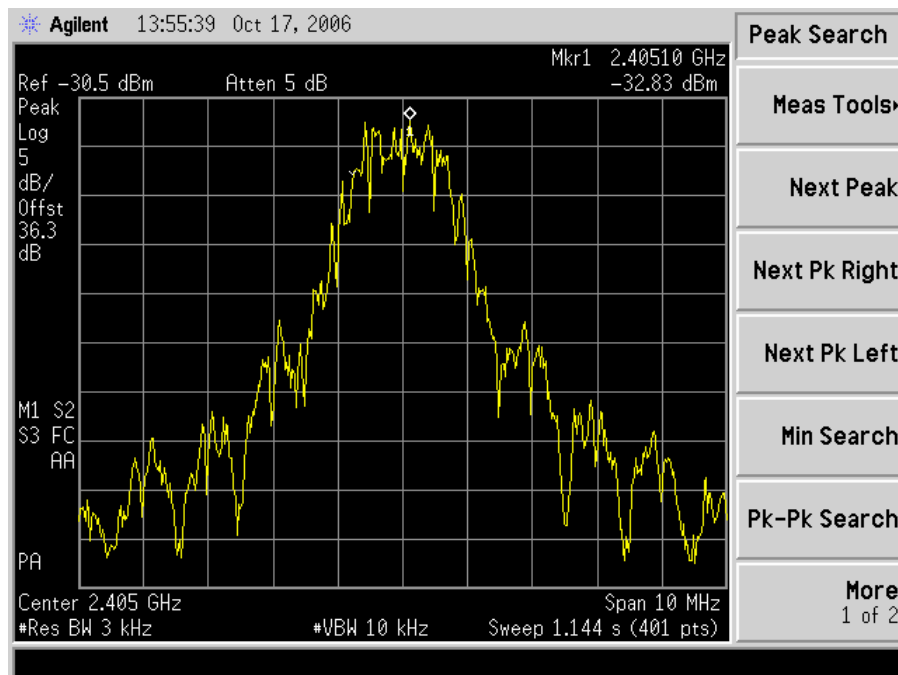
Test Equipment Used:

| Equip. ID | Description | Manufacturer | Model | Serial Number | Cal Date | Cal Due |
|-----------|--------------------------|--------------|----------------------|-----------------|----------|----------|
| 77 | EMI Receiver | R & S | ES17 | 100044 | 10/14/05 | 10/14/06 |
| 192 | Handheld Manometer | Omega | HHP-102F | 19.99/29.0 PSIA | 02/23/06 | 02/23/07 |
| 260 | Humidity Temperature | Extech | 445580 | 17-260 | 10/26/05 | 10/26/06 |
| 30 | DMM | Fluke | 8060A | 6191012 | 02/02/06 | 02/02/07 |
| 82 | Bi-ConiLog Antenna | Schaffner | CBL6112B | 2726 | 06/13/06 | 06/13/07 |
| 128 | RF Cable | Custom made | #1 | none | 08/01/06 | 08/01/07 |
| 131 | RF Cable | Custom made | #4 | none | 08/01/06 | 08/01/07 |
| 271 | Horn Antenna | A H Systems | SAS-571 | 787 | 02/08/06 | 02/08/07 |
| 101 | EMI Receiver | Agilent | E7405A | US40240235 | 11/23/05 | 11/23/06 |
| 222 | Pre-Amp | Miteq | AMF-4D-001180-24-10P | 1020106 | 08/01/06 | 08/01/07 |
| 213153 | High Pass Filter, 4 GHz | Reactel | 7HS-4G/18G-S11 | 01-7 | 03/06/06 | 03/06/07 |
| 213154 | High Pass Filter, 3 GHz | Filtek | HP12/3000-5AB | 15B57-01 | 03/06/06 | 03/06/07 |
| 213023 | Antenna, Horn, 18-40 GHz | EMCO | 3166 | 9310-2222 | 3/22/06 | 3/26/07 |

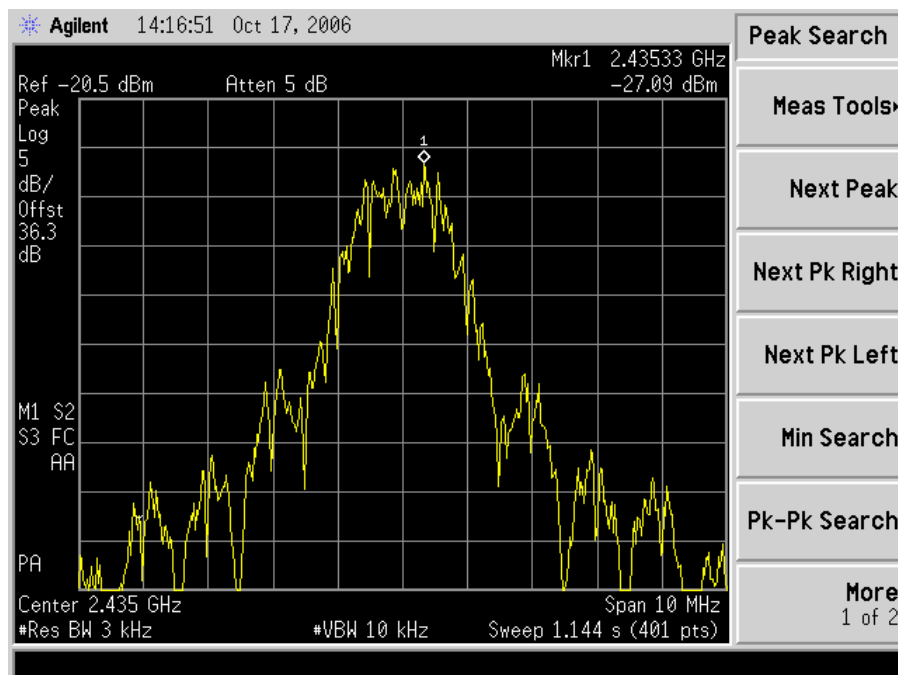
Test Results:

Notes: The cable loss was compensated for in the spectrum analyzer.

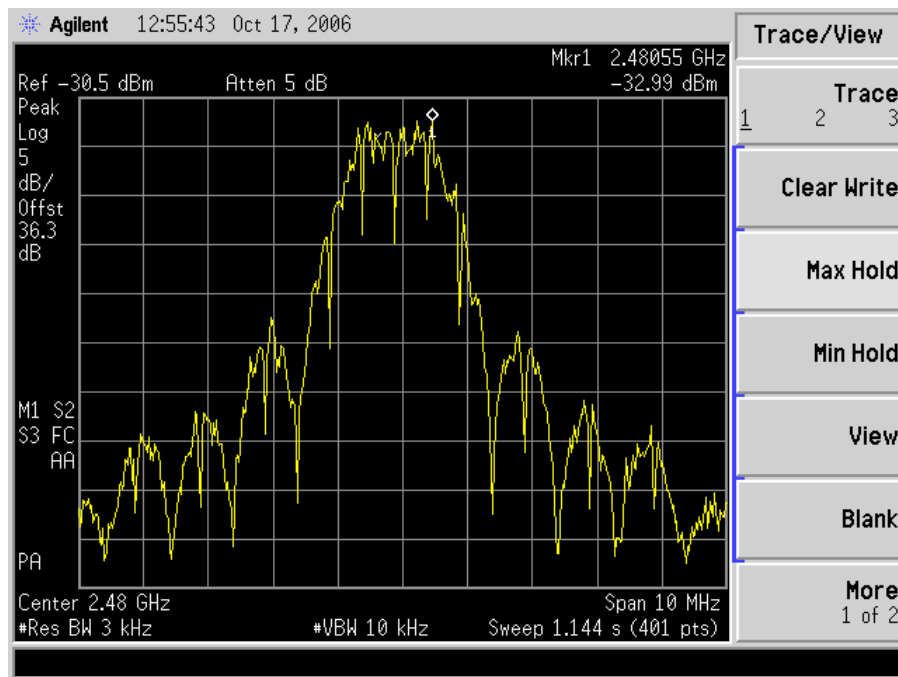
| Channel | Frequency | Peak Power Spectral Density |
|---------|-----------|-----------------------------|
| 11 | 2405 MHz | -32.83 dBm |
| 17 | 2435 MHz | -27.09 dBm |
| 26 | 2480 MHz | -32.99 dBm |



Channel 11 Peak Power Spectral Density



Channel 17 Peak Power Spectral Density



Channel 26 Peak Power Spectral Density

6.6 Test: Band Edge Compliance

Test Standard: FCC 15.215, RSS-210 2.1, A8.5

Test Results: Pass

Test Environment:

| | | | | | | |
|--|---------------|-----|-----------------------|-----|---------------|-----|
| Environmental Conditions During Testing: | Humidity (%): | N/A | Pressure (hPa): | N/A | Ambient (°C): | N/A |
| Pretest Verification Performed | N/A | | Equipment under Test: | | BEACON | |

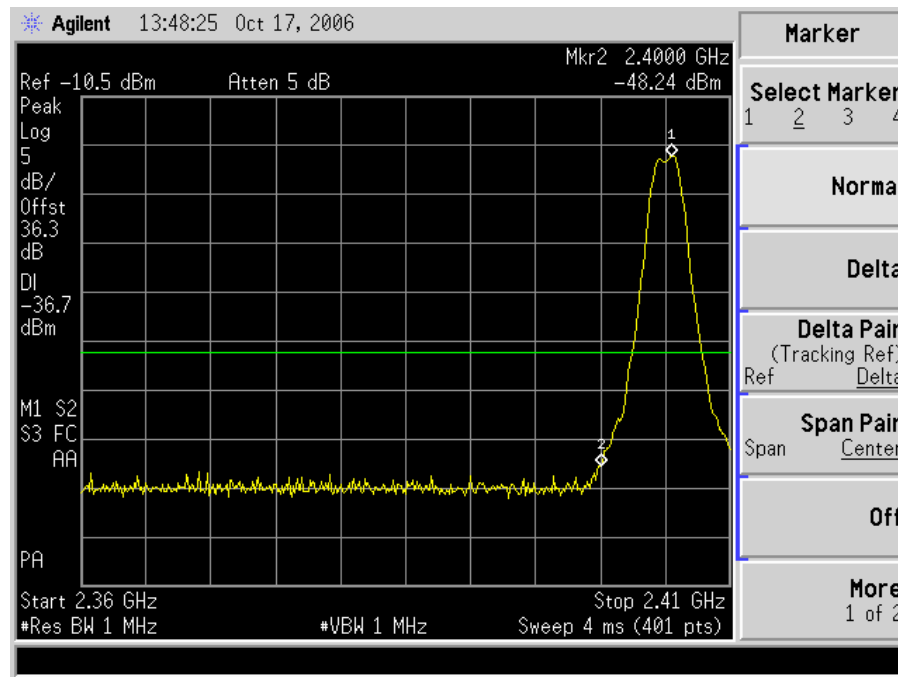
Maximum Test Parameters: The fundamental frequency of the Radio Module must stay within the assigned frequency band.

Test Equipment Used:

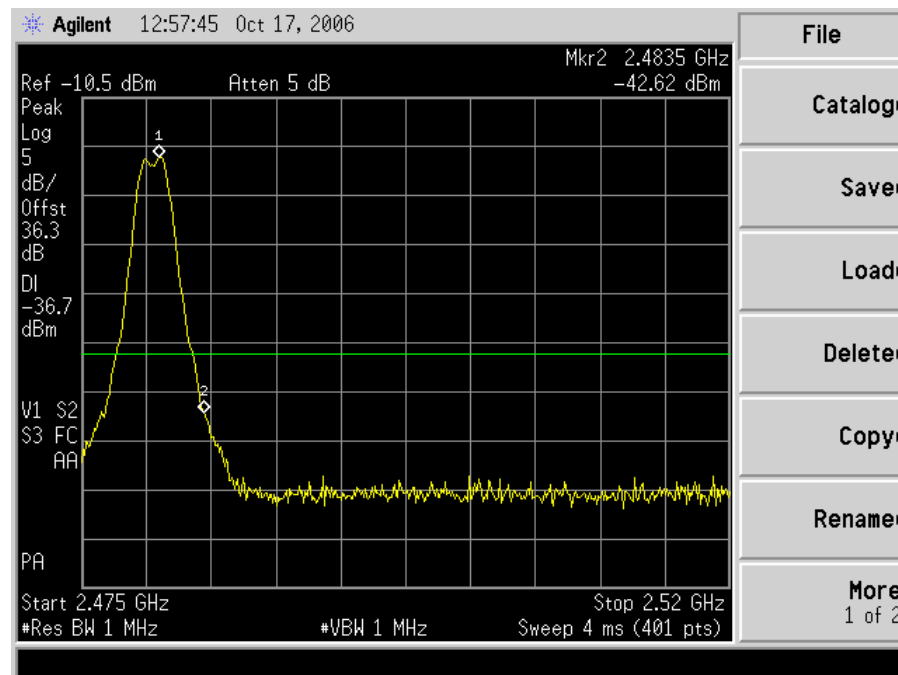
| Equip. ID | Description | Manufacturer | Model | Serial Number | Cal Date | Cal Due |
|-----------|--------------------------|--------------|----------------------|-----------------|----------|----------|
| 77 | EMI Receiver | R & S | ES17 | 100044 | 10/14/05 | 10/14/06 |
| 192 | Handheld Manometer | Omega | HHP-102F | 19.99/29.0 PSIA | 02/23/06 | 02/23/07 |
| 260 | Humidity Temperature | Extech | 445580 | 17-260 | 10/26/05 | 10/26/06 |
| 30 | DMM | Fluke | 8060A | 6191012 | 02/02/06 | 02/02/07 |
| 82 | Bi-ConiLog Antenna | Schaffner | CBL6112B | 2726 | 06/13/06 | 06/13/07 |
| 128 | RF Cable | Custom made | #1 | none | 08/01/06 | 08/01/07 |
| 131 | RF Cable | Custom made | #4 | none | 08/01/06 | 08/01/07 |
| 271 | Horn Antenna | A H Systems | SAS-571 | 787 | 02/08/06 | 02/08/07 |
| 101 | EMI Receiver | Agilent | E7405A | US40240235 | 11/23/05 | 11/23/06 |
| 222 | Pre-Amp | Miteq | AMF-4D-001180-24-10P | 1020106 | 08/01/06 | 08/01/07 |
| 213153 | High Pass Filter, 4 GHz | Reactel | 7HS-4G/18G-S11 | 01-7 | 03/06/06 | 03/06/07 |
| 213154 | High Pass Filter, 3 GHz | Filtek | HP12/3000-5AB | 15B57-01 | 03/06/06 | 03/06/07 |
| 213023 | Antenna, Horn, 18-40 GHz | EMCO | 3166 | 9310-2222 | 3/22/06 | 3/26/07 |

Test Results:

Notes: The cable/Antenna loss was compensated for in the spectrum analyzer. A 100 kHz bandwidth and peak detector was used, and a marker was placed at the peak fundamental level. A marker was placed at the band edge at the highest signal outside the band edge.



Channel 11 Band Edge Compliance



Channel 26 Band Edge Compliance